

Naval Health Research Center

Best Available Copy

APPLIED ANTHROPOLOGY ON  
THE ICE: A MULTIDISCIPLINARY  
PERSPECTIVE ON HEALTH AND  
ADAPTATION IN ANTARCTICA

AD-A198 926

L. A. PALINKAS  
E. K. E. GUNDERSON

REPORT NO. 88-21

Best Available Copy

Approved for public release; distribution unlimited

NAVAL HEALTH RESEARCH CENTER  
P.O. BOX 65122  
SAN DIEGO, CALIFORNIA 92136

NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND  
BETHESDA, MARYLAND

38 9 30 073

DTIC  
ELECTE  
SEP 30 1988  
S E D



**Best  
Available  
Copy**

**APPLIED ANTHROPOLOGY ON THE ICE: A MULTIDISCIPLINARY PERSPECTIVE ON HEALTH  
AND ADAPTATION IN ANTARCTICA**

Lawrence A. Palinkas, Ph.D.

E.K. Eric Gunderson, Ph.D.

Naval Health Research Center

P.O. Box 85122

San Diego, CA 92138-9174

To expedite communication of our research, this is a preprint of a paper submitted to Human Organization and should be cited as a personal communication.

Report No. 88-21, supported by the Naval Medical Research and Development Command, Bethesda MD, Department of the Navy, and the National Science Foundation, Washington D.C., under Agreement No. DPP-8716461. Any opinion, findings and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation or the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government.

## **SUMMARY**

### **Problem**

Until now, the study of group adaptation and individual adjustment to prolonged isolation in the Antarctic and their effect on human health and performance has largely been conducted by psychologists, psychiatrists, and physiologists. However, applied anthropology is in a unique position to contribute to an understanding of the effect of prolonged isolation on health and performance and to develop programs to reduce the stress and other risk factors for disease and illness both on the ice and subsequent to the return to the outside world.

### **Objective**

This paper describes the health and adaptation of Antarctic winter-over personnel and outlines some of the ways in which applied medical anthropology can play a central role in understanding and improving health and performance under conditions of prolonged isolation in an extreme environment.

### **Approach**

The history of social and behavioral science research on the human experience in Antarctica is reviewed. Of particular interest are the sources and symptoms of stress among winter-over personnel, the relationship between stress and illness, and the moderating influence of personality, social support, and culture in this relationship.

### **Results**

Scientists and support personnel who winter-over in the Antarctic experience a number of physiological and psychological changes which are a response to the harsh environmental conditions and prolonged isolation. In this respect, the winter-over experience may be likened to a number of routine stressful life events which are associated with an increased risk of illness and

disease. However, the long-term record of health and performance among winter-over personnel subsequent to Antarctic duty suggest that a certain positive benefit may be acquired from the experience. This is perhaps due to the role of station microcultures which enable individuals to cope with the stress of prolonged isolation in an extreme environment. The experience of coping under such conditions may provide resources and strategies enabling the individual to cope with subsequent stressful life events.

#### Conclusion

Applied anthropologists could examine the role of station microcultures in coping with the stress of prolonged isolation in an extreme environment. Ethnographic fieldwork by anthropologists could also serve to validate quantitative measures of stress, health, and performance. The holistic perspective of anthropology would allow for an examination of the respective contributions of group and individual processes to adaptation, the importance of meaning systems which define adaptation and identify the role of health and performance in that definition, and the interaction between biomedical and cultural components of health and adaptation. In doing so, applied research could make important contributions to the development of biocultural models of health and human behavior.

<b>Accession For</b>	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



## **Applied Anthropology on the Ice: A Multidisciplinary Perspective on Health and Adaptation in Antarctica**

Applied medical anthropologists have made important contributions to an understanding of health and human behavior in a wide variety of sociocultural and environmental contexts. Strange as though it may seem, the potential for such a contribution also exists in the Antarctic. Although lacking an indigenous population, each year thousands of men and women from around the world visit the frozen continent as part of a concerted program of scientific research. Some of these individuals remain there for an entire year in isolation from the outside world. Such work is not without its risks, however. As the world's highest, driest, coldest, and windiest continent, Antarctica is a harsh and demanding place. Those who remain for extended periods must contend with social and environmental stressors which jeopardize physical and mental health and cause noticeable decrements in work performance.

Until now, the study of group adaptation and individual adjustment to prolonged isolation in the Antarctic and their effect on human health and performance has largely been conducted by psychologists, psychiatrists, and physiologists. However, these processes occur in a sociocultural context which provides a unique opportunity for anthropologists to contribute to a multidisciplinary effort to understand the effect of prolonged isolation on health and performance and develop programs to reduce the stress and other risk factors for disease and illness both on the ice and subsequent to the return to the outside world. Simultaneously, as a "natural laboratory for the social and behavioral sciences" (Pierce 1985; Shurley 1974), Antarctica provides an opportunity for anthropologists to contribute to the biocultural models which have become the hallmark of medical anthropology.

This paper will examine these contributions by briefly describing the health and adaptation of Antarctic winter-over personnel and outlining some of the ways in which applied medical anthropology can play a central role in understanding and improving health and performance under conditions of prolonged isolation in an extreme environment.

## BACKGROUND AND PRELIMINARY STUDIES

### Prolonged Isolation and Stress in the Antarctic

Scientists and support personnel who winter-over in the Antarctic are subjected to a combination of physiological and psychological changes. Physiological changes include dyspnea, arterial hypoxia, headaches, hypocapnia, hyperventilation, suppression of the immune system, hyperthyroidism, a complete absence of Stage IV sleep as well as sizable reductions in the amount of Stage III and REM sleep, and a disruption of circadian rhythms. These are attributed to extreme environmental conditions including high altitude, extreme light-dark cycles, and the absence of viral and bacterial agents.

Similarly, most Antarctic winter-over personnel display a cluster of symptoms known as the "winter-over syndrome." This syndrome is characterized by varying degrees of depression; irritability and hostility; insomnia; and cognitive impairment, including difficulty in concentration and memory, absentmindedness, and the occurrence of mild fugue states known as "long-eye." These symptoms have been observed to increase over time (Gunderson 1963), peaking at mid-winter, and then declining during the third quarter of winter-over duty, only to increase again at the end of the winter-over period. In some instances, alcohol abuse has been a problem on the ice, leading to disruption of social relations among station personnel, decreased work perfor-

mance, and increased risk for accidental injury (Blair 1983). On the other hand, episodes of severe psychopathology, resulting in confinement of personnel or midwinter evacuation when feasible, have been rare.

Although many of these symptoms are attributed to the physiological changes experienced by winter-over personnel, the most significant stressors underlying these conditions appear to be psychosocial in nature (Lantis 1968). Apart from the physiological changes associated with the harshness of the environment, the physical environment appears to have had little impact on the winter-over syndrome. Danger, hardship, or the direct effects of cold have not represented important stressors (Mullin, 1960), nor have improvements in station living conditions significantly reduced the incidence of these symptoms (Gunderson 1974). However, prolonged isolation in a small community such as a research station carries with it a set of internal and external psychosocial stressors. External sources of stress include the inability to contact family and friends, real or imagined unpleasant events at home, and feelings of rejection resulting from delays in arrival of relief parties, shortages in supplies, and interference with station autonomy by outside authorities and parent agencies. Internal sources of stress include the lack of privacy in cramped quarters, boredom due to the lack of social and environmental stimulation, sexual and emotional deprivation, and the absence of statuses and roles defining one's social position in the outside world (Natani and Shurley 1974).

#### Post-Antarctic Followup

Most of the research to date on the effects of prolonged exposure to the Antarctic environment has focused on the physiological changes which have occurred at the end of the winter-over period. A number of studies, for instance, (Meschievitz, Raynor and Dick 1983; Muchmore, Parkinson and Scott



1983) have noted the rash of upper respiratory infections and colds which occur among winter-over personnel at the opening of a station each year. This is attributed to the immunosuppressed state of winter-over personnel due to the climate, psychological stress, and absence of viral agents, (Muchmore, Blackburn, Shurley, Pierce, and McKown 1970; Williams, Climie, Muller, and Lugg 1986). Sleep studies have also demonstrated that South Polar Plateau subjects lose all stage IV sleep as well as significant amounts of stage III and REM. The restoration of a standard sleep-EEG pattern has required as long as 24 months after return from a year in the Antarctic (Natani and Shurley 1974).

There have also been reports of emotional problems among winter-over personnel upon their return to the United States. Oliver (1979) indicated that for as much as 12 months after returning to the U.S., personnel who wintered over at McMurdo Station in 1977 reported feelings of isolation and problems with readjusting to the larger society for periods as long as 12 months. There have also been some anecdotal reports among Australian winter-over personnel of attempted suicides, severe depression and alcohol abuse upon their return from the Antarctic.

A series of studies conducted at the Naval Health Research Center (Palinkas 1985, 1986, 1987, 1988; Palinkas et al. 1986) have shown that enlisted Navy personnel who wintered-over between 1963 and 1974 exhibited significantly fewer subsequent first hospitalizations than a control group of enlisted personnel who were accepted for winter-over duty but who were assigned elsewhere. The decreased risk of subsequent disease and injury incidence was observed for all-cause total first hospitalizations; neoplasms; endocrine, nutritional and metabolic diseases; and diseases of the musculoskeletal system (Palinkas 1986). When these rates were examined by six-month

intervals, an increase in the rate of first hospitalizations was observed, peaking at approximately nine months after returning from the Antarctic. However, this increase did not place them at risk when compared with the control group. Moreover, the relative risk declined significantly after this period of readjustment (Palinkas 1987).

Several alternative explanations have been offered to account for this finding, but one of the most intriguing possibilities is that winter-over personnel may derive positive benefits from the experience enabling them to cope with subsequent stressful life events and reduce the long-term risk for illness and disease. Winter-over personnel have been found to be more independent and self-reliant at the end of the winter-over period (Taylor 1974). There is also evidence of improved cognitive performance after wintering-over (Gregson 1978). Those who have prior experience in Antarctica generally perform better and exhibit fewer interpersonal problems than individuals who winter-over for the first time (Taylor 1984). Certain psychosocial characteristics of winter-over personnel have been found to be independently associated with decreased risk of first hospitalizations (i.e., control over others, achievement, education) (Palinkas, Stern and Holbrook 1986). However, even when differences in pre-Antarctic personality measures are controlled for, the winter-over group continued to display significantly fewer first hospitalizations subsequent to Antarctic duty than the control group. This led to speculation that winter-over personnel develop coping strategies while on the ice, enabling them to cope with subsequent stressful experiences.

#### Life Events and Stress

An exceptional number of studies in the last 30 years have suggested that stressful life events precipitate somatic and psychological disease

(Dohrenwend and Dohrenwend 1974; Gunderson and Rahe 1974). These studies have linked various forms of physical and psychological morbidity and mortality to discrete events such as bereavement, unemployment, and migration, as well as an accumulation of life change events and daily hassles. The sequelae of stressful life events range from fluctuations in the sympathetic adrenal-medullary system and the pituitary adrenal-cortex system, to anxiety and depression, to chronic disease such as coronary heart disease, to accidental injuries, and finally, to death.

However, the correlation between stressful life events and illness is typically only .30 and the standard deviation of both distributions is often eight times the mean (Rabkin and Struening 1976). Moreover, recent studies suggest that such events do not necessarily have disruptive long-term effects (Cassel 1976). Many investigators have speculated that the way in which people handle stressful life circumstances may be one important set of moderators. Increasing emphasis has been placed on the individual's attempts to utilize personal and social resources to manage stress reactions and to take specific actions to modify the problematic aspects of the environment, a diverse collection of cognitions and behaviors labeled coping responses. Among these coping responses are psychological characteristics with various labels such as control, coherence, mastery, personal autonomy, and hardiness. The various forms of instrumental and emotional support obtained through social ties and relationships have also been shown to moderate the effects of stressful life events and thus promote health and protect people against disease, even death (Cobb 1976; Berkman and Syme 1979).

Personality and social support are both perceived as buffering the impact of stressful life events. However, what has not been examined is the possibility of positive benefits from the life event itself. While it is

problematic to assert that stress may be good with corresponding health status benefits, we know that people can learn from stressful experiences. Studies of behavior modification and psychotherapy indicate that positive benefits can result in successfully coping with life events by "innoculating" individuals from further stress and thus reducing the risk of illness associated with subsequent life events (Meichenbaum 1985; Moos and Schaefer 1986). Successful coping with a crisis may enhance self-esteem or provide opportunities for strengthening social ties with family and friends.

#### Antarctic Microcultures

Previous research has indicated that the relationship between stressful life events and illness is also mediated by culture (Dressler 1985; Palinkas and Colcord 1985). Constituting "a set of rules for interpreting experience and shaping action" Bailey (1983:13), cultural patterns of belief and behavior may influence the relationship between stress and disease in several ways, including: (1) the degree of exposure to activities and events viewed as stressful such as prolonged isolation or occupational hazards; (2) the cognitive appraisal of these events as being stressful; (3) the availability of different coping strategies designed to manage particular stress situations and prevent them from resulting in illness, such as somatization, aggression, smoking or drinking, eating, use of particular kinds of support, and so on; and, (4) the consequences of stress on illness in terms of health behavior, such as differences in the expression of symptoms and the utilization of modes of treatment (Kleinman 1980; Kleinman, Eisenberg and Good 1977).

Antarctic research stations have been referred to as "microcultures" (Natani and Shurley 1974; Palinkas 1988). In one sense, these stations are a microcosm of the larger Euro-American sociocultural systems they represent.

Station members speak the same language, share similar values, and interact in predictable ways with each other and other members of their respective cultures. However, it is perhaps more accurate to state that the stations are a product of the interaction between selected features of the larger sociocultural system and an unusual environment. The ordered array of beliefs and values governing behavior in an Antarctic research station includes the social characteristics of station members such as age, sex, ethnicity, and socioeconomic status; the organizational cultures of their employers (NSF, U.S. Navy, civilian contractors); the nature of their mission in Antarctica (scientific research and support); and the constraints imposed on human habitation by the physical environment (restricted contact with the outside world; climate; limited mobility).

Although the microcultures of Antarctic stations differ from country to country, station to station, and even year to year as personnel rotate in and out of stations, there are points of commonality and continuity. These include the scientific and support mission of personnel; social behavior related to leisure and recreation (Nelson 1973); symbols and rituals marking transitions and rites of passage (Taylor 1974); processes of group formation and conflict (Palmai 1961); the development of a group identity (Palinkas 1988); and standards for performance and appropriate behavior (Nelson 1965). These standards themselves may be a source of stress. In the past, inability or unwillingness to perform assigned duties has resulted in social ostracism (Biersner 1981; Palinkas 1988). Individual station members may also be prohibited by these standards from utilizing stress-coping strategies routinely employed in the United States such as excessive drinking, avoidance, or reliance on certain individuals for social support (Palinkas 1988). On the other hand, the station microcultures also provide or identify appropriate

strategies for coping with the stress associated with the extreme environment and social isolation. These strategies identify the types and networks of available social support; the emphasis placed on certain psychological resources such as mastery and self-reliance; and the commitment to the assigned task and to the social group.

### CONCLUSION

Anthropologists can make a unique contribution to a multidisciplinary effort to understand the effect of prolonged isolation on health and performance and develop programs to reduce the stress and other risk factors for disease and illness both on the ice and subsequent to the return to the outside world. This contribution would take three different forms. First, anthropologists can provide an understanding of the sociocultural context of the stress-illness relationship, particularly the role of the station micro-culture in moderating the adverse effects of social and environmental stressors and providing station members with skills and resources useful for coping with subsequent life events. Second, ethnographic fieldwork by anthropologists can serve to validate the quantitative measures of health, stress, and coping obtained on the ice and determine if they are meaningful from an emic as well as etic perspective. Third, the holistic perspective of anthropology may be fruitfully employed in the examination of human health and adaptation in the Antarctic. Such a perspective would be wider in scope than those contained in the theoretical paradigms of psychology, psychiatry, and sociology. It would allow for an examination of the respective contributions of group and individual processes to adaptation, the importance of meaning systems which define adaptation and identify the role of health and performance in that definition, and the interaction between biomedical and

cultural components of health and adaptation. As Scheper-Hughes and Lock (1987:31) observe, such a perspective is critical because "sickness is not just an isolated event, nor an unfortunate (or, in this case, intentional) brush with nature. It is a form of communication--the language of the organs--through which nature, society, and culture speak simultaneously."

By understanding this form of communication as it occurs in the Antarctic, applied medical anthropologists are in a position to make important contributions in the development of biocultural models of health and human behavior. Specifically, studies of Antarctic station microcultures enable us to examine the role of culture in moderating three sets of relationships: relationships between social (i.e., isolation, conflict) and environmental (i.e., altitude, cold, dark) stressors; relationships between physiological symptoms (neuroendocrine changes; hypoxia) and psychological symptoms (depression, insomnia, fugue-like states); and relationships between symptoms and social behavior. Despite the unique environmental context, the paradigms originating from such studies will potentially generate testable hypotheses which could, in turn, be applied to a wide variety of environmental and sociocultural contexts. Applied social and behavioral science research on the human experience in Antarctica is considered to be especially relevant to the screening, training, and development of organizational and biomedical support for personnel engaged in long-term missions in space (Palinkas 1986; Pierce 1985). Even among earth-bound populations, however, such research could contribute to the development of health promotion and stress reduction strategies and programs for high-risk individuals and groups. Then, rather than being a cultural void or "information sink," as characterized by Pyne (1986), Antarctica could be an important source of information on human health and behavior in general.

#### REFERENCES

Bailey, F.G.

1983 The Tactical Uses of Passion. Ithaca: Cornell University Press.

Berkman, Lisa F., and Leonard Syme

1979 Social Networks, Host Resistance, and Mortality: A Nine-Year Follow-up Study of Alameda County Residents. American Journal of Epidemiology 109: 186-204.

Biersner, Robert J.

1981 Adjustment to Antarctica: Observations and Guidance for Screening Procedures and Policy. Unpublished manuscript.

Blair, Sidney M.

1983 Debriefing Report: McMurdo Station, Winter-Over 1983. Unpublished manuscript.

Cassel, J.

1976 The Contribution of the Social Environment to Host Resistance. American Journal of Epidemiology 104: 107-123.

Cobb, S.

1976 Social Support as a Moderator of Life Stress. Psychosomatic Medicine 3: 300-314.

Dohrenwend, Barbara S., and Bruce D. Dohrenwend (Eds.)

1974 Stressful Life Events: Their Nature and Effects. New York: John Wiley and Sons.

Dressler, William W.

1985 Psychosomatic Symptoms, Stress, and Modernization: A Model. Culture, Medicine and Psychiatry, 9, 257-286.



Gregson, R.A.

- 1978 Monitoring Cognitive Performance in Antarctica. New Zealand  
Antarctic Record 1: 24-32.

Gunderson, E. K. Eric

- 1963 Emotional Symptoms in Extremely Isolated Groups. Archives of General  
Psychiatry 9: 362-368.
- 1974 Psychological studies in Antarctica. In Human Adaptability to  
Antarctic Conditions. E.K. Eric Gunderson, ed. Pp. 115-131. Washington,  
D.C.: American Geophysical Union.

Gunderson, E. K. Eric, and Richard H. Rahe, (Eds.)

- 1974 Life Stress and Illness. Springfield: Thomas.

Kleinman, Arthur

- 1980 Patients and Healers in the Context of Culture: An Exploration of  
the Borderland between Anthropology, Medicine, and Psychiatry. Berkeley:  
University of California Press.

Kleinman, Arthur, Leon Eisenberg, and Byron Good

- 1977 Culture, Illness and Care: Clinical Lessons from Anthropologic and  
Cross-Cultural Research. Annals of Internal Medicine, 88, 251-258.

Lantis, Margaret

- 1968 Environmental Stresses on Human Behavior: Summary and Suggestions.  
Archives of Environmental Health 17: 578-585.

Marmot, M.G., and S.L. Syme.

- 1976 Acculturation and Coronary Heart Disease in Japanese-Americans.  
American Journal of Epidemiology 104: 225-247.

Meichenbaum, Donald

- 1985 Stress Inoculation Training. New York: Permagon.

Meschievitz, C.K., W.J. Raynor, E.C. Dick

1983 Cold Severity, Duration, and Epidemiology in Persons Emerging from Isolation Compared to Newly Arrived Persons at McMurdo Station.

Antarctic Journal of the United States 18: 232-234.

Moos, R.H., and J.A. Schaefer, (Eds.)

1986 Coping with Life Crises: An Integrated Approach. New York: Plenum.

Muchmore, H.G., A.B. Blackburn, J.T. Shurley, C.M. Pierce, and B.A. McKown

1970 Neutropenia in Healthy Men at the South Polar Plateau. Archives of Internal Medicine, 125, 646-648.

Muchmore, H.G., A.J. Parkinson, and E.N. Scott

1983 Respiratory Virus Infections During the Winter at the South Pole.

Antarctic Journal of the United States 17: 229-230.

Mullin, C.S.

1960 Some Psychological Aspects of Isolated Antarctic Living. American Journal of Psychiatry 117: 323-325.

Natani, K., and J.T. Shurley

1974 Sociopsychological Aspects of a Winter Vigil at South Pole Station.

In Human Adaptability to Antarctic Conditions. E.K.E. Gunderson, ed. Pp. 89-114. Washington, D.C.: American Geophysical Union.

Nelson, Paul D.

1965 Psychological Aspects of Antarctic Living. Military Medicine 130: 485-489.

1973 The Indirect Observation of Groups under Confinement and Isolation.

In Man in Isolation and Confinement. J. Rasmussen, ed. Pp. 167-194. Chicago: Aldine.

Oliver, Donna M.

- 1979 Some Psychological Effects of Isolation and Confinement in an Antarctic Winter-Over Group. Unpublished doctoral dissertation, San Diego: School of Human Behavior, United States International University.

Palinkas, Lawrence A.

- 1985 Long-Term Effects of Environment on Health and Performance of Antarctic Winter-Over Personnel. Report No. 85-48. San Diego: Naval Health Research Center.
- 1986 Health and Performance of Antarctic Winter-Over Personnel: A Follow-up Study. Aviation, Space and Environmental Medicine 57: 954-959.
- 1987 A Longitudinal Study of Disease Incidence among Antarctic Winter-Over Personnel. Aviation, Space and Environmental Medicine 58: 1062-1065.
- 1988 Sociocultural Influences on Psychosocial Adjustment in Antarctica. Medical Anthropology, in press.

Palinkas, Lawrence A., and Christine L. Colcord

- 1985 Health Risks among Enlisted Males in the U.S. Navy: Race and Ethnicity as Correlates of Disease Incidence. Social Science and Medicine 20: 1129-1141.

Palinkas, Lawrence A., Martin J. Stern, and Troy L. Holbrook

- 1986 A Longitudinal Study of Personality and Disease Incidence among Antarctic Winter-Over Volunteers. Report No. 86-25. San Diego: Naval Health Research Center.

Palmai, G.

- 1963 Psychological Observations on an Isolated Group in Antarctica. British Journal of Psychiatry 131: 651-654.

Pierce, Chester M.

1985 Social Science Research in High Latitudes. *Journal of Clinical Psychology* 41: 581.

Pyne, S. J.

1986 *The Ice: A Journey to Antarctica*. Iowa City, IA: University of Iowa Press.

Rabkin, J., and E. Struening

1976 Life Events, Stress, and Illness. *Science* 194: 1013-1020.

Scheper-Hughes, Nancy, and Margaret Lock

1987 *The Mindful Body: A Prolegomenon to Future Work in Medical Anthropology*. *Medical Anthropology Quarterly* N.S. 1: 6-41.

Shurley, J.T.

1974 Antarctica is also a Prime Natural Laboratory for the Behavioral Sciences. In *Polar Human Biology: Proceedings of the SCAR/IUPS/IUBS Symposium on Human Biology and Medicine in the Antarctic*. O.G. Edholm and E.K.E. Gunderson, eds. Pp. 430-435. Chicago: Heinemann.

Taylor, Anthony J.

1974 The Adaptation of New Zealand Research Personnel in the Antarctic. In *Polar Human Biology: Proceedings of the SCAR/IUPS/IUBS Symposium on Human Biology and Medicine in the Antarctic*. O.G. Edholm and E.K.Eric Gunderson, eds. Pp. 417-429. Chicago: Heinemann.

1984 The Selection of People for Work in Polar Regions: New Zealand and the Antarctic. Paper presented to a working group of the World Health Organization, Anchorage, Alaska.

Williams, D.L., A. Climie, H.K. Muller, and D.J. Lugg.

1986 Cell-Mediated Immunity in Healthy Adults in Antarctica and the Subantarctic. *Journal of Clinical and Laboratory Immunology* 20: 43-49.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

## REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS None		
2a. SECURITY CLASSIFICATION AUTHORITY N/A			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NHRC Report No. 88-21			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION Naval Health Research Center		6b. OFFICE SYMBOL (if applicable) Code 30		7a. NAME OF MONITORING ORGANIZATION Commander, Naval Medical Command	
6c. ADDRESS (City, State, and ZIP Code) P. O. Box 85122 San Diego, CA 92138-9174			7b. ADDRESS (City, State, and ZIP Code) Department of the Navy Washington, DC 20372-5120		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Naval Medical Research & Development Command		8b. OFFICE SYMBOL (if applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code) Naval Medical Command, National Capital Region Bethesda, MD 20814-5044			10. SOURCE OF FUNDING NUMBERS		
PROGRAM ELEMENT NO. 62770A		PROJECT NO. 3M162770.		TASK NO. A870.	
				WORK UNIT ACCESSION NO. AR 621	
11. TITLE (Include Security Classification) (U) APPLIED ANTHROPOLOGY ON THE ICE: A MULTIDISCIPLINARY PERSPECTIVE ON HEALTH AND ADAPTATION IN ANTARCTICA					
12. PERSONAL AUTHOR(S) PALINKAS, Lawrence A., GUNDERSON, E.K.Eric					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) 1988 May 31	
15. PAGE COUNT					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Performance Human Factors Applied Anthropology		
			Isolation Health Sociocultural moderators		
			Stress Antarctica		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This paper describes the health and adaptation of Antarctic winter-over personnel and outlines some of the ways in which applied medical anthropology can play a central role in understanding and improving health and performance under conditions of prolonged isolation in an extreme environment. The history of social and behavioral science research on the human experience in Antarctica is reviewed. Of particular interest are the sources and symptoms of stress among winter-over personnel, the relationship between stress and illness, and the moderating influence of personality, social support, and culture in this relationship. Scientists and support personnel who winter-over in the Antarctic experience a number of physiological and psychological changes which are a response to the harsh environmental conditions and prolonged isolation. However, the long-term record of health and performance among winter-over personnel subsequent to Antarctic duty suggest that a certain positive benefit may be acquired from the experience. This is perhaps due to the role of station microcultures which enable individuals to cope with the stress of prolonged isolation in an					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL Dr. Lawrence A. Palinkas			22b. TELEPHONE (Include Area Code) (619) 553-8389		22c. OFFICE SYMBOL Code 30

DD FORM 1473, 84 MAR

83 APR edition may be used until exhausted

All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

U.S. Government Printing Office: 1985-507-047

Continued from Block 19.

extreme environment. The holistic perspective of anthropology would allow for an examination of the respective contributions of group and individual processes to adaptation, the importance of meaning systems which define adaptation and identify the role of health and performance in that definition, and the interaction between biomedical and cultural components of health and adaptation. In doing so, applied research could make important contributions to the development of biocultural models of health and human behavior.

(AW/KD)